DISEASED MAXILLARY ANTRUM.

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In order to treat intelligently a diseased organ, it is essential that we have a thorough knowledge of the physiology and anatomy, as well as the relation of the surrounding parts of the organ. Otherwise we cannot form a correct idea of the pathological condition we have to deal with. The antrum being nothing more than a subdivision of one of the nasal cavities, we shall first consider the general anatomy and physiology of the nostril.

In the simplest form of animal life, which we find existing in water, the olfactory organ consists of two small depressions on the surface of the snout. These depressions are covered with epithelium, and are connected with the brain by olfactory nerves. As we ascend higher in the scale of fishes we find these depressions become larger, and are like pockets, but do not communicate with the mouth. Notice Illustration No. 1.

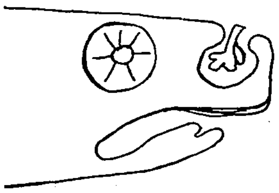

ILLUSTRATION NO. 1.

Still higher in the scale of animal life, such as the snake or turtle, which lives at times in water, and in the air, the process of respiration becomes different. The structure of the olfactory organ becomes changed: the nasal cavities have a respiratory, as well as an olfactory portion.

Still higher in the scale, in those animals which have an acute sense of smell, such as the dog, the arrangement becomes more complex. The main cavity subdivides into many smaller cavities, and the turbinates are more numerous and subdivide into many branches. In these animals the accessory cavities communicate freely with the main cavity, the olfactory nerve endings are distributed throughout the mucous membrane of all the accessory cavities. In man, who is endowed with higher faculties, and not dependent upon his sense of smell for finding food, this system of labyrinths has degenerated into much simpler structures. The olfactory nerves are no longer distributed throughout the accessory sinuses. Notice Illustration No. 2, which is a rough diagram of the nasal cavities:

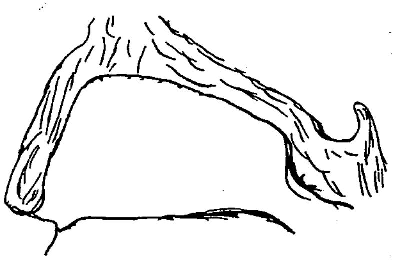

ILLUSTRATION NO. 2.

The entrance in each nostril is a small opening, but the main cavity is large; then, again, the exit is a small opening. It is thus seen that the nostril is really a reservoir with a small opening at each end, and might be compared to a lake where the air flows pure and free and yet retarded long enough to be warmed and moistened during its journey through the nose. The air is still further retarded by the two turbinates, which afford more surface for the air to pass over; and then the accessory sinuses keep an amount of residual air to mix with the fresh air.

On the outer wall of the main nasal cavity, situated beneath the middle turbinate, are several small openings, which are the openings of the accessory sinuses; respectively, frontal sinus, Ethmoid cells, and Antrum of Highmore. These accessory cavities are closely related, and are branches of the same main cavity. They develop by a budding out from the main cavity along a crescentic groove known as the Hiatus Semilunaris. See Illustration No. 3.

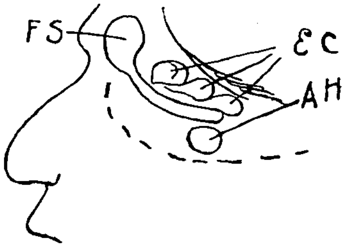

ILLUSTRATION NO. 3.

F. S. is the Frontal Sinus; E. C. the Ethmoid Cells; and A. H. the Antrum of Highmore. The dotted curved line marks the outline of the middle turbinate, which has been removed. The upper end of the Hiatus Semilunaris spreads up and out over the orbit and forms the Frontal Sinus. The Ethmoid Cells develop along the upper edge of the groove. The Antrum of Highmore develops from the lower extremity of the groove and spreads out under the orbit.

In the dog the frontal sinus and ethmoid cells empty directly into the Antrum of Highmore by means of the crescentic groove; but fortunately for the dog the normal opening in the antrum extends down to the floor and empties into the nose in the inferior meatus; while in man the normal opening in the Antrum is situated high up above the floor and empties into the middle meatus above the inferior turbinate. You can readily see from the close relation along this groove how easy it is for one sinus to transmit infection to the other. They are often simultaneously involved.

The Antrum of Highmore, as stated above, buds out from the lower extremity of the Hiatus Semilunaris, and spreads from this point outward, forward and downward. There is little or no development upward, on account of the orbit.

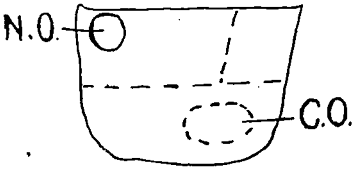

ILLUSTRATION NO. 4.

Chart No. 4 shows the inner wall of the Antrum; N. O. represents the normal opening; the horizontal dotted line shows the line of attachment of the inferior turbinate on the nasal surface of this wall; the vertical dotted line shows the position of the Lacrimo Nasal Duct. C. O. shows place for counter-opening into inferior meatus.

When there is any failure in development it is usually in the downward direction. This is why the floor of the Antrum is sometimes found to be very thick. Illustration No. 5 shows the difference in thickness that the floor of the Antrum may develop.

The Antra are pyramidal-shaped cavities with bases toward the nostrils. The principal surfaces of interest to the surgeon are the inner or nasal wall and the anterior wall. On the inner or nasal wall, which forms the partition between the Antrum and the main nasal cavity, are the following landmarks. (See

Illustration No. 4.) The normal opening is situated high up at the posterior angle, a bad location for drainage. Beneath the line of insertion of the inferior turbinate, and in front of the location of the lacrimo-nasal duct, the wall is very thin, and is the place to make a counter-opening from antrum into the nose, and is the best place for drainage. The points to be remembered about the anterior wall are that the antrum extends out as far as the malar ridge, and to be careful not to injure the infra-orbital nerve.

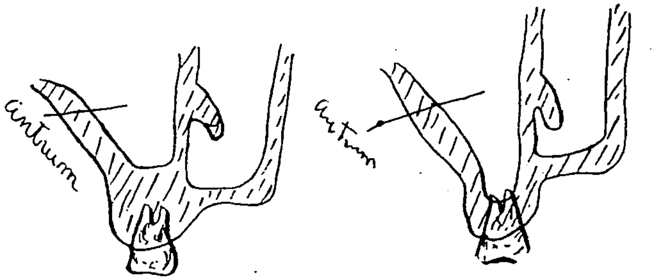

ILLUSTRATION NO. 5.

As to pathology, the diseased condition is the same that we have in any bony cavity lined with mucous membrane in which there is bad drainage. In the acute attacks there is hyperæmia, and swelling of the mucous membrane and increased secretion. If the normal source of drainage is blocked by the swelling; or the discharge is kept pouring into the antrum from the cavities above (frontal sinus and the ethmoid cells); it accumulates, and the bacteria present increases the inflammatory process, the mucous membrane becomes thickened, and granulation and polyps may form. If the antrum becomes closed it may rupture either into the orbit, spheno-maxillary fossa, or into the nose.

As to treatment, if seen in the acute stage, first try to establish free drainage. The nose should be sprayed with a 2% cocaine solution, and then a solution of adrenalin. If pus is seen beneath the middle turbinate, pass a small piece of cotton saturated with 10% cocaine solution up beneath the anterior end of the middle turbinate, and leave it there for a few minutes. Remove the cotton and pass a flat spatula up beneath the turbinate and curette such granulations as may have formed there to block the exit of the discharge from the antrum.

I always use trans-illumination in suspected antrum disease, and have found it a great aid quite often. If in doubt, in fact in every case of suspected antrum trouble, I pass a trocar up beneath the anterior end of the inferior turbinate, about half an inch back from the tip of the turbinate, and into the antrum through the thin part of the wall described above. If the trouble does not subside, and in all chronic cases, amputate the anterior end of the middle turbinate, and curette the granulation and necrosed ethmoid cells. If this fails to relieve, then amputate the anterior end of the inferior turbinate, and make an opening into the antrum through the thin portion of the internal wall of the antrum through the inferior meatus. This is the point described above, and is the best location for drainage. The antrum can be irrigated through this opening. In acute cases this method has served me well: but in chronic cases the Caldwell Luc operation has served best.

In doing the Caldwell Luc operation, make the opening in the front wall large enough so that the antrum may be thoroughly curetted and inspected. Pass a strip of gauze saturated with peroxide of hydrogen into the antrum, and then swab the cavity with dry sponges of gauze. Insert a small electric lamp into the cavity, and you can see the granulations left there. In curetting the cavity pay particular attention to the angles, especially the region of the normal opening. The counter-opening is enlarged and made smooth down to the floor of the nose. The antrum is dried and packed with a strip of gauze in such a way that the last end is passed out of the counter opening and out of the front of the nose. The strength of this strip of gauze should be tested, as it may break off while removing, and a piece be left in the antrum.

Some operators close the opening in the mouth at the time of operation. I prefer not to do this, as I may wish to inspect the antrum after the gauze has been removed. The mouth wound will close itself in time. The gauze should be removed through the nose in four or five days.

In conclusion, first resort to conservative treatment before recourse is had to radical methods; for many cases of acutely diseased antra may be relieved by shrinking the region of the normal opening beneath the middle turbinate.

When the front wall has been opened, a counter-opening should be made into the nose through the inferior meatus, and the antrum drained through the nose.

In cleaning the antrum after it has been thoroughly curetted, sponge the cavity with peroxide of hydrogen, dry, and inspect the angles. Always test the strength of the strip of gauze before inserting into the antrum.

Remember that the antrum may be a secondary infection from one of the sinuses above, and proper drainage secured for their discharge.